Engineering

Technical Standard

TS 0513 – SA Water Supplement to Vacuum Sewer Code: WSA06

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Government of South Australia

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Application & Interpretation of this Document

It is the responsibility of the users of this Supplement to ensure that the application of information is appropriate and that any designs based on this Supplement are fit for SA Water's purposes and comply with all relevant WSA Standards, Australian Standards, Acts and regulations.

Users of this Supplement accept sole responsibility for interpretation and use of the information contained in this Supplement. Users should independently verify the accuracy, fitness for purpose and application of information contained in this Supplement.

Only the current revision of this Supplement should be used which is available for download from the SA Water website.

Significant/Major Changes Incorporated in This Edition

This is the first issue of this Technical Standard. However, WSA 06 and this Technical Standard supersede existing and historical design documents, including:

- SA Water Supplementary Documentation, Vacuum Sewerage Code – Introduction and Parts 1, 2, 3 & 4
- Engineering and Water Supply 1983 Sewerage Technical Instructions

Document Controls

Revision History

Revision	Date	Author	Comments
1.0	29/11/23	J Skirrow	Final.

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Approvers

Role	Signature and Date
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Role	Name	Revision	Review Date
Manager Engineering Quality & Innovation	Matthew Davis	1.0	29/11/23

Contents

1 Introduction

SA Water is responsible for the construction and commissioning of an extensive amount of engineering infrastructure such that it is safe and fit for purpose.

This Supplement has been developed to assist in the design, maintenance, construction, and management of vacuum sewer and associated infrastructure.

1.1 Purpose

The purpose of this Technical Standard is to provide supplementary detail to WSA 06-2008 V1.3 (Vacuum Sewage Code of Australia) based on SA Water's unique context and suite of Technical Standards, which supersede parts of the Code.

1.2 Glossary

All glossary terms and abbreviations shall be as per WSA 06-2008 V1.3 Part 0, unless noted otherwise.

The following additional glossary items are used in this document:

Term	Description
AC	Asbestos Cement
ADWF	Average Dry Weather Flow
AEP	Annual Exceedance Probability
CMH	Control Maintenance Hole
EP	Equivalent Population
DAFI	Development Agreement Formal Instrument
FoS	Factor of Safety
Ha	Hectare
L	Litre
L/s	Litre per second
MH	Maintenance Hole
NPV	Net Present Value
O&M	Operations and Maintenance
PDF	Peak Daily Flow
PDWF	Peak Dry Weather Flow
SA Water	South Australian Water Corporation
SCM	Sewer Construction Manual (SA Water Standard Drawing Set)
SiD	Safety in Design (refer TS 0101)
TDRF	Technical Dispensation Request Form
TG	SA Water Technical Guideline
TS	SA Water Technical Standard
WH&S	Work Health and Safety
WSA(A)	Water Services Association (of Australia)
WWF	Wet Weather Flow

1.3 References

1.3.1 Australian and International

The following table identifies Australian and International standards and other similar documents referenced in this document:

Number	Title
WSA02	Gravity Sewerage Code of Australia
WSA04	Sewage Pumping Station Code of Australia
AS1657	Fixed platforms, walkways, stairways and ladders - Design, construction and installation
AS2124	General conditions of contract
AS2566.1	Buried flexible pipelines - Structural design
AS3000	Electrical Installations
AS3996	Access covers and grates
AS4300	General conditions of contract for design and construct
AS4678	Earth-retaining structures
AS/NZS 4797	Stainless steel chain for lifting purposes (Reconfirmed 2019)

1.3.2 SA Water Documents

The following table identifies the SA Water standards and other similar documents referenced in this document:

Number	Title
SCM	Sewer Construction Manual (SA Water Standard Drawing Set)
TG 0530	Sewer Network Hydraulic Design Considerations to Minimise Network Odour Impact
TS 0101	Safety in Design
TS 0109	Infrastructure Design
TS 0121	Physical Security Site Standards
TS 0130	As Constructed Data Requirements for Linear Assets
TS 0132	Operations and Maintenance Manuals
TS 0136	Pipework Access and Protection
TS 0210	Pressure Testing of Pipelines
TS 0245	Design Requirements for Ventilation and Cooling Systems
TS 0300	Supply and Installation of Low Voltage Electrical Equipment
TS 0420	Welding Requirements (Metal)
TS 0465	Mortar Repair Systems
TS 0502	Authorised Products – Gravity Sewer and Pressure Pumping Main Systems
TS 0523	Requirements for Technical Drawings in Land Development Projects (when published)
TS 0524	CCTV Inspection of Gravity Sewer Infrastructure
TS 0601	Design, Assessment and Retrofitting of SA Water Assets in Bushfire-Prone Areas
TS 0620	Decommissioning and Demolition of Assets (when published)

Number	Title
TS 0622	Pipeline Design Requirements (when published)
TS 0631	Fine Materials for Pipe Embedment
TS 0710	Concrete
TS 0711	Concrete Remedial Works
TS 0712	Temporary Works (when published)
TS 146b	Requirements for Pump Specification, Procurement and Testing and The Preparation of Pump Datasheets

1.4 Acts and Regulations

The following table identifies the relevant Acts and Regulations referenced in this document:

Acts and Regulations
Water Industry Act and Regulations 2012
Environmental Protection Act 1990
Work Health and Safety Act 2012

1.5 Definitions

The following definitions are applicable to this document:

Term	Description
Accepted	Determined to be satisfactory by the Representative
Contract Documents	A set of documents supplied to Constructor as the basis for construction; these documents contain contract forms, contract conditions, specifications, drawings, addenda, and contract changes
Constructor	The organisation responsible for constructing and installing infrastructure for SA Water whether it be a third party under contract to SA Water or an in-house entity.
Designer	The organisation responsible for designing infrastructure for SA Water whether it be a third party under contract to SA Water or a Constructor, or an in-house entity
Designer's Representative	For works delivered under a Development Agreement Formal Instrument (DAFI), is the person accountable for the design (or their representative)
Representative	The Representative shall be either one of the following: • For Works delivered under a Developer Agreement Formal Instrument (DAFI), this shall be the Designer's Representative. o Where witness or hold points on site are required under this standard, SA Water's Representative shall also be provided with notice to attend at their discretion. • For works delivered directly for SA Water under a Contract or engagement, this shall be SA Water Representative This definition shall replace the terms "Superintendent" or "Superintendent's Representative" provided in WSA06.
Responsible Discipline Lead	The engineering discipline expert responsible for TS 0513 defined on page 3 (via SA Water's Representative)
TDRF	Technical Dispensation Request Form. This form is part of SA Water's Technical Dispensation Request Procedure which details the process by which those required to comply, or ensure compliance, with SA Water's technical requirements may seek dispensation from those requirements.
SA Water's Representative	The SA Water representative with delegated authority under a Contract or engagement, including (as applicable): • Superintendent's Representative (e.g. AS 4300 & AS 2124 etc.) • SA Water Project Manager • SA Water nominated contact person
'Shall' and 'Should'	In this Standard the word 'shall' indicates a requirement that is to be adopted in order to comply with the Standard. The word 'should' indicates practices which are advised or recommended.

2 Scope

2.1 Scope and Application of this Supplement

In February 2020, WSAA Codes were gazetted by the Office of the Technical Regulator to become the mandatory minimum water infrastructure standard in South Australia.

This Supplement is to be read in conjunction with the following:

- SCM - Sewer Construction Manual (SA Water Standard Drawing Set)
- WSA 06-2008 v1.3.

Section 3 provides the details of the SA Water requirements where there is a variation to WSA 06-2008 v1.3 and describes how this supplement should be read in conjunction with WSA 06-2008 v1.3.

Where a WSA 06-2008 v1.3 Section is not listed within this document, SA Water requirements shall be assumed to be equal.

2.2 Works Not in Scope

This Supplement only applies to WSA 06-2008 V1.3.

2.3 Hierarchy of Documentation

The following hierarchy of documentation will apply:

- This document
- SA Water Technical Standards and Construction Manual Drawings
- WSAA codes (including figures)
- Australian Standards
- International Standards

Any conflicting information should be raised with SA Water.

2.4 Technical Dispensation

Departure from any requirement of this Technical Standard shall require the submission of Technical Dispensation Request Form (TDRF) for the review and approval (or otherwise) of SA Water Principal Engineer listed in Page 3, on a case-by-case basis.

The Designer shall not proceed to document/incorporate the non-conforming work before the Principal Engineer has approved of the proposed action in writing via the Technical Dispensation Request Form (TDRF).

SA Water requires sufficient information to assess dispensation requests and their potential impact. The onus is therefore on the proponent to justify dispensation request submissions and provide suitable evidence to support them.

Design works that are carried out without being appropriately sanctioned by SA Water shall be liable to rejection by SA Water and retrospective rectification by the Designer/Constructor.

3 Supplementary Requirements to WSA 06-2008 V1.3

This section outlines supplementary requirements which elaborate on, or deviate from, those presented within WSA 06-2008 V1.3.

3.1 Part 1 - Planning and Design

This section outlines supplementary requirements which elaborate on or deviate from those presented within WSA 06-2008 V1.3 Part 1 – Planning and Design.

WSA 06 Section	SA Water Supplementary Information
1.5 **Planning and Design Responsibilities and Interfaces**	**Insert after 1.5.1** **The Design/Approval Process** The Proponent/Developer (and their Designer), of a Vacuum Sewerage system, are required to enter into the following two stage process to gain SA Water Approval. **Stage 1** Hold an initial meeting with SA Water to agree the key parameters for a study of the potential technologies that can be used to service the development. The Developer and/or the Designer are required to bring the following to that initial meeting: • A clear indication of the preferred type of Vacuum Sewerage technology for the development. • A preliminary Vacuum Sewerage layout drawing. • The Designer's preliminary notes, including preliminary estimates of actual likely suction heads required at the property collection chambers. A summary of capital and operational costs, clearly demonstrating that Vacuum Sewerage will be more cost effective than conventional gravity sewerage, based on a 25 year NPV basis. All assumptions made in that process shall be identified, and it must also include the Developer's contributions towards the on-property costs. • Details of the flows likely to be discharged into SA Water's sewerage system and these should also set out all of the stages of the development, so that a discharge point can be determined into SA Water's sewers. • Details of the Designer's experience with Vacuum Sewerage systems, including examples of where they have designed these systems previously. • Adjoining land zonings. • Topographic considerations, including catchment boundaries and contour information. • Past and future development profiles, including land release projections, etc. • Likely study area description. • Information on any large non-domestic discharges including commercial, industrial and schools.

WSA 06 Section	SA Water Supplementary Information
	• Any other information that may be pertinent to the proposed development and future surrounding developments. Following the initial meeting, SA Water will indicate in writing if Vacuum Sewerage can be pursued in the Development Application. **Stage 2** Second meeting with SA Water to discuss final approval to use Vacuum Sewerage in the Development Application will be given, conditional upon: • The production of a final design that meets the design requirements, as set out in WSA 06- 2008 V1.3 and this SA Water Supplement TS 0513. • A hydraulic computer model of the Vacuum Sewerage system, which identifies and confirms pipe sizes, and details the anticipated pressures at the differing contour points for the development. The hydraulic modelling software used shall be approved by SA Water prior to commencement of design. • Calculation of the maximum hydraulic retention time in the system, evidence of compliance with TG0530, and details of any in main treatment or odour suppression equipment. • Confirmation of the pumping units to be used in the development, and the number of spare vacuum interface valves being provided. These units will need to meet the requirements spelt out in this WSA 06- 2008 V1.3 and this SA Water Supplement TS 0513, and SA Water's Technical Specification. • Environmental impacts of the proposal. • How the remainder of the subdivision is to be serviced, if the application is only for part of the development. • Details of flushing points and the preparation of a flushing program during the growth of the development. The frequency of this flushing needs to be indicated, in the form of a full flushing program. • Details of pipes, valves and fittings in a scheduled format. Final Approval will be given by SA Water in writing. Detailed design of the pressure sewer system is the responsibility of the Developer. SA Water will determine the design review gates required for approval.

WSA 06 Section	SA Water Supplementary Information
1.5.2 **Planning Responsibilities**	**Supersede the section with the following:** SA Water is responsible for overall network master planning of its gravity sewer network, including catchment area, flows, flow estimating methodology, the discharge location and identification of any project-specific requirements. Use of vacuum sewer systems requires the Developer (and their Designer), to satisfy the requirements of Section 1.5.1 above, which includes additional planning inputs to model the pressure system and its interface/s with SA Water's gravity network.
1.5.3 **Design Responsibilities**	**Insert the following text after the list ending "(vi) (G) property service connection locations.":** • A hydraulic computer model of the vacuum sewerage system, which identifies and confirms pipe sizes, and details the anticipated pressures at the differing contour points for the development, • Details of any odour mitigation equipment • Confirmation of the pumping units to be used in the development, and the number of spare units being provided. These units will need to meet the requirements spelt out in WSA06 and SA Water's Technical Standards. • How the remainder of the subdivision is to be serviced, if the application is only for part of the development, • Details of flushing points and the preparation of a flushing program to accommodate all stages of the development • Details of pipes, valves, and fittings. Final acceptance will be provided by SA Water in writing.
1.6.2 **System Design Life**	**Supersede Section 1.6.2 with the following:** Design Life requirements for SA Water infrastructure shall be in accordance with TS 0109.
1.6.3 **Objectives of the System Design**	**Insert at end of list, before final sentence** The primary goals/objectives required of any pressure sewerage installation shall be as follows: • Ensure the reticulation and property mains remain clear of any solids and liquid waste accumulation. • Retain the sewage in the mains for a minimum time to avoid it becoming septic and thus difficult to treat. • Ensure that the vacuum in the pipeline does not exceed the allowable operating capacity of the pipe and fittings. • Ensure that vacant properties can be connected with relative ease at a later date. • If required, ensure the on-property installation results in minimal inconvenience to the resident, by having a once on and off the property approach for the installation and commissioning of the collection chamber and the vacuum interface valve.

WSA 06 Section	SA Water Supplementary Information
	• If required, ensure the involvement of the property owner in the design of the property layout to meet their reasonable expectations, whilst still complying with the requirements of WSA 06-2008 V1.3 and this Technical Standard. • Ensure there is minimal general inconvenience in the areas where the system is being installed. • Ensure the system will operate satisfactorily when only a minimal number of properties are connected. This needs to be particularly focussed on in new subdivisions, where development may take some time to reach the critical numbers the system was designed on. • Minimise overall costs to the community in the installation of the system whilst still meeting the design objectives and requirements for the particular technology. • Ensure the technology is supported by appropriate maintenance arrangements, spare parts availability and onshore manufacturer support so that the installation of such a system will not disadvantage those that have Vacuum Sewerage systems in comparison with conventional gravity systems. • Ensure that adequate and adjacent clearances around each property or commercial/industrial zone collection chamber, (including parking exclusion zones), is provided to ensure safe access for operation and maintenance activities. These clearance zones shall be reviewed during the SiD process and an agreed outcome reached with SA Water's O&M team.
2.7 **Staging**	**Insert at end of Section 2.7:** Staging of developments should be considered during planning and design to ensure the performance requirements are met at all stages of development. Where relevant, addressing the following considerations should be considered: • Lot connection dates, • Upgrades to downstream wastewater infrastructure, • Sewage detention time, • Impact on system odour, • Pipe flow velocities, • Dead end sections, and • Low number of connections to the main, • Flushing point locations at the end of the reticulation main, • Flushing programs. Where the area to be serviced is planned for large increases in future system growth the Designer shall, in conjunction with SA Water, consider the use of dual mains to reduce detention times of sewage in the pressure main in the initial stages of operation.

<table>
<tr><th>WSA 06 Section</th><th>SA Water Supplementary Information</th></tr>
<tr><td></td><td>Where the loads on mains may fluctuate considerably during the year, the Designer shall consider the use of dual/different sized mains. Examples of these applications include, but are not limited to, caravan parks and camping areas (particularly in beachside areas), where the population will vary considerably with season and special events.</td></tr>
<tr><td>2.11
Commissioning Plan</td><td>Delete the following text from Section 2.11:
Where a commissioning plan is not supplied by the Water Agency
Insert at the end of Section 2.11:
For SA Water's Operations and Maintenance Manuals requirements, refer TS 0132. Ownership of on-property components will not transfer to SA Water; they remain the property owner's responsibility.</td></tr>
<tr><td>3.2
Design Tolerances</td><td>Insert at the end of Section 3.2:
Minimum cover shall satisfy the requirements of TS 0136.</td></tr>
<tr><td>3.4
Unforeseen Ground Conditions</td><td>Supersede Section 3.4 with the following:
Where ground conditions not identified on the Design Drawings and/or Design Documentation are encountered, the Constructor shall refer to the Designer for review of the structural design. The Designer shall make appropriate amendments to the Design Drawings as required, and reissue with appropriate version control to supersede previous versions.</td></tr>
<tr><td>3.6.4 Contaminated Sites</td><td>Replace item (a) with:
(a) Need for site contamination assessment.</td></tr>
<tr><td>3.6.5
Tidal Zones</td><td>Insert the following at the end of Section 3.6.5:
Consideration for impacts of climate change in design levels shall be incorporated in accordance with TS 0109.</td></tr>
<tr><td>3.6.6
Flood Prone Areas</td><td>Insert the following additional Section 3.6.6:
<u>3.6.6 Flood Prone Areas</u>
To prevent stormwater infiltration within the system, the following levels shall be observed and documented on the design drawings:
<table>
<tr><th>System Component</th><th>Minimum clearance above 1% AEP flood level</th></tr>
<tr><td>Top of storage tank</td><td>At least 300mm</td></tr>
<tr><td>Base of alarm/control panel</td><td>At least 300mm</td></tr>
<tr><td>Pump station vent</td><td>At least 300mm</td></tr>
</table>
Areas prone to flooding and AEP levels may be sourced from Local Government and Catchment Management Authorities and shall be incorporated into the design process as detailed in Section 1.5.
Infrastructure located in the Murray River floodplain shall comply with the requirements of TS 0109.</td></tr>
</table>

WSA 06 Section	SA Water Supplementary Information
3.7 **Easements**	**Supersede Section 3.7 with the following:** All sewerage easements shall be vested in the name of the South Australian Water Corporation. Collection chambers may only be located inside a property boundary, with the approval of SA Water. This considered most likely to be the case for industrial/commercial properties. In such cases, an access easement is to be provided. Access and easement sizes are to be sufficient to allow maintenance vehicle access (the size is to be approved by SA Water). For commercial and industrial properties, allowance shall be provided for an allocated SA Water Vehicle reserved parking area with 24-hour access. SA Water easements may only be shared with Council (Local Government) stormwater pipes and shall comply with the requirements of TS 0136. Other authorities and utilities (especially power, gas, telecommunications etc.) are not permitted to share the SA Water sewer easement to accommodate their respective facilities, due to WH&S implications for SA Water maintenance and operational personnel, or personnel contracted by SA Water. **3.7.1 Location of Sewers/Easements** All vacuum sewers and appurtenances shall normally be located in roadways in accordance with the requirements TS 0136. Vacuum sewers shall not be located in easements to achieve capital cost minimisation where satisfactory routes in roads are available and viable, as this adversely affects SA Water's access and ongoing maintenance requirements. Easement alignments may be located as follows: • across the front of an allotment • across the rear of an allotment • along the side of the allotment • any other agreed alignment (e.g. crossing parks and reserves) Sewer easements shall generally be located in the allotment served by that sewer, or if the property adjoins a park/reserve, the sewer may be located in the park/reserve, providing: • suitable vehicle access to the sewer can be demonstrated to SA Water (and is accounted for during safety in design per TS 0101) • the sewer pipeline is well clear of existing or proposed locations of trees and shrubs, in accordance with the minimum clearances specified in TS 0136 • the minimum horizontal clearance between the outside face of the sewer and an existing or proposed building or structure shall be as detailed in TS 0136 • Easement width is as specified in TS 0136. **3.7.2 Cover in Easements** The minimum and maximum cover shall comply with TS 0136

WSA 06 Section	SA Water Supplementary Information
	3.7.3 Categories of Easements Easements are divided into two categories: • Category 1: Not shared with stormwater pipes • Category 2: Shared sewer and stormwater easements For further details regarding these categories and the location of SA Water infrastructure refer to TS 0136 and SCM drawing 4005-20002-03. Where a sewerage easement is shared with a stormwater pipeline, the Council/Developer shall obtain their own stormwater easement from the landowner. The stormwater easement may overlap either a portion or the whole width of the SA Water sewer easement. The shared easement arrangement must be approved by the Council (or whoever is the owner of the stormwater pipeline). Under no circumstances shall the sewer and stormwater pipeline arrangement (as shown in SCM drawing 4005-20002-03) be reversed, resulting in the sewer being closer than the prescribed distance from the allotment boundary/ edge of easement. SA Water takes no responsibility for the stormwater pipeline, other than any damage caused to the stormwater pipeline by SA Water personnel or personnel contracted by SA Water. To facilitate sub-divisional activity and to accommodate Council requirements for back-of-block or side-of-block stormwater pipelines, SA Water has typically (but is under no obligation to) acquired wider sewer easements to accommodate sewer and stormwater pipelines. For the following special situations, SA Water shall determine easement widths as well as pipeline alignments within easements, on a case-by-case basis: • at SA Water's discretion for situations where site specific conditions warrant additional evaluation (e.g. excessive depth of sewer, angle of repose considerations, difficult access requirements etc.). • for large diameter stormwater pipelines (greater than DN375) • where butt jointed concrete stormwater pipes are used: o leakage from the stormwater pipes into the single size granular sewer embedment media is very likely, thereby unnecessarily exacerbating the existing 'French drain' effect associated with sewers o replacing a section of sewer adjacent to a discontinuous stormwater pipeline (e.g. butt jointed concrete pipes) is unnecessarily difficult and expensive, requiring special side support for the individual concrete pipe lengths. **3.7.4 Easements Obtained Under Development Contracts** The Developer shall be responsible for all costs associated with the acquisition of sewer easements that are required within the development.

WSA 06 Section	SA Water Supplementary Information
	Easements within the development shall be established based on the Final Plan of the Development. The final plan shall be prepared and lodged with the Development Assessment Commission by the Licensed Surveyor engaged by the Developer. Where easements external to the development are required, the Developer may acquire the easements independently or may request that SA Water acquire the easements at the developers cost.
3.9 **Crossings**	**Supersede Section 3.9 with the following:** Crossings shall comply with the requirements of TS 0136.
3.10 **Mechanical Protection of Pipelines**	**Supersede Section 3.10 with the following:** Crossings shall comply with the requirements of TS 0136.
3.12 **Obstructions and Clearances**	**Supersede entirety of Section 3.12 (with the exception of Section 3.12.7) with the following:** Minimum clearances to obstructions shall be in accordance with TS 0136.
3.13 **Disused or Redundant Pipelines**	**Replace the second paragraph starting "The Specification shall specify action …" with:** Decommissioning of disused or redundant pipework shall be in accordance with TS 0620.
3.14.1 **Septicity**	**Replace point (e) in Section 3.14.1 with the following:** (e) Chemical dosing shall not be used, unless approved via a TDRF. TDRF submissions must detail why passive odour reduction methods (per TG 0530) have not been incorporated into the design, and justify the use and ongoing cost of dosing systems against these considerations.
5.2 **Vacuum Station Design Inflows**	**Insert at end of Section:** Vacuum station design flowrates for greenfield sites shall be based on a minimum 500L per domestic property per day (ADWF) and the following peaking factors: 2.6 multiplier to calculate PDWF, and 4.2 to calculate PWWF. Both multipliers are relative to ADWF. These factors shall be confirmed with SA Water at concept design stage.
6.1 **Vacuum Station Design – Introduction**	**Insert at end of Section:** All design requirements listed in this document for the vacuum pumping station shall be deemed to be SA Water's minimum requirements. Any deviation from these requirements shall be subject to approval via a TDRF.

WSA 06 Section	SA Water Supplementary Information
9.5.1 **Pipe Work and Fittings for Vacuum Sewers - General**	**Insert at end of Section:** Allowable vacuum sewer system piping shall be in accordance with TS 0506.
9.6.1 **Division Valves – General**	**Insert at end of Section:** Authorised valves (per those provided in TS 0506) with PE tails can be used in lieu of flanged valves on PE mains. Divisional valves SHALL BE CLOCKWISE CLOSING.
9.6.3 **Division Valve Covers**	**Insert at end of Section:** Valves shall be mounted within standard 450 mm DI street boxes in accordance with TS 0506, with the cover to be marked SEWER.
10.1.2 **Location**	**Insert at end of Section:** Collection Chambers are not to be installed on private property without location specific approval via a TDRF. Location of the collection chamber will be based on the proximity of other services (e.g. property driveway, water supply, power (including light poles etc), telecommunications and gas).
10.1.3 **Number of properties connected**	**Supersede second paragraph with the following:** The maximum allowable number of property connections attached to a single collection chamber is 4. Individual property connections may be interconnected once outside the boundary of each property, prior to connecting to the vacuum collection chamber. Each property connection is to include a standard connection IP adjacent to the property boundary (as for gravity sewers). Each property is to have a 100mm upstream or head vent, on the internal drainage system, as specified in AS/NZS 3500.2.
10.1.4 **Maximum Flows to Collection Chambers**	**Insert the following to the end of the section:** Where flows exceed 0.25 L/s, additional infrastructure shall be provided as follows: o A standby pump, designed to handle the full property flow, in addition to the duty pump o Storage volume to accommodate 2 hours PDWF. This storage is to be supplied if the required volume calculated is more than that required under Clause 10.1.8.
10.1.8 Emergency Storage	**Insert at the end of section:** Emergency storage volume shall cater for 12 hours' worth of storage volume at ADWF. This is to be the total for up to 4 properties contributing to each single collection chamber.

WSA 06 Section	SA Water Supplementary Information
11.4.1 Pump Selection – General	**Supersede "Duty and standby pumpsets shall have the same rating" with the following:** Duty and standby pumpsets shall comply with all aspects of wastewater pumps defined in TS 0146b from selection to factory testing.
11.4.5 Electric Motors	**Superseded this section with the following:** Electric Motors shall be in accordance TS 0300
11.5 Pump Starters and Variable Speed Drive	**Insert at the start of section:** Electric Motors shall be in accordance TS 0300.
12.5.1 **Valves - General**	**Insert at end of section:** Only CLOCKWISE CLOSING valves shall be used in SA Water's infrastructure, in accordance with TS 0506.
14.2.5.2 **Pipe Cover**	**Replace item (f) with the following:** Minimum depth of cover shall be in accordance with TS 0136.
14.2.5.4 **Pipe Embedment**	**Insert at start of section:** Vacuum and pumped mains are to be embedded in packing sand that meets the requirements of TS 0631.
14.2.11.1 **Pipeline Anchorage**	**Insert at start of section:** All in-line main valves shall be anchored in accordance with SA Water WSCM drawings 4005-30003-07 and 4005-30003-09.
16.4 Security	**Insert at the end of section:** Refer to TS 0120 and TS 0121 for installation and operation of electrical and physical security systems.
16.5 Fire Control	**Insert at the end of section:** Refer to TS 0601.
16.6 HVAC	**Add in a new section 16.6:** Refer to TS 0245 for the design of building ventilation and cooling systems.
19.1.3 **Operation and Maintenance Requirements**	**Supersede section and replace with the following text:** Operation and Maintenance Manuals shall be prepared and supplied to SA Water in accordance with TS 0132
19.2 **Design Drawings**	**Supersede section and replace with the following text:** Drawings shall be prepared in accordance with TS 0523
19.3 **Drafting Standards**	**Supersede section and replace with the following text:** Drawings shall be prepared in accordance with TS 0523

WSA 06 Section	SA Water Supplementary Information
Additional Requirements to WSA 06-2008 V1.3, Part 1	**Approval of Pumping Units** There are several Vacuum Sewer technologies available. Recognising the impracticality of supporting all technologies, SA Water will at any time only support a limited range of authorised technologies. SA Water will provide details of authorised pumping units on request. SA Water will not accept handover of any unauthorised vacuum sewer technology. SA Water's TS 0506 – Approved Products – Vacuum Sewer Systems provides detail of currently approved products. **Installation of Pumping Units** • **Public places** o Where pumping infrastructure is to be installed on what is public property, the lids to these structures are required to be locked in place to prevent entry by non-authorised personnel.

3.2 Part 2 – Products and Materials

This Section outlines supplementary requirements which elaborate on or deviate from those presented within WSA 06-2008 V1.3 Part 2 – Products and Materials.

WSA 06 Section	SA Water Supplementary Information
20 **Products and Materials Overview**	**Supersede Sections 20.4 and 20.5 with the following text:** All products and materials shall be as per those approved within TS 0500, TS 0502, and TS 0506. The use of alternative products and materials will require a submission of a Technical Dispensation Request Form (TDRF) in accordance with SA Water's Technical Dispensation Request Procedure. Refer to TS 0501 for SA Water's product approval processes.

3.3 Part 3 – Construction

This Section outlines supplementary requirements which elaborate on or deviate from those presented within WSA 06-2008 V1.3 Part 3 – Construction

WSA 06 Section	SA Water Supplementary Information
22.1.2 **Quality Management System**	**Insert at the end of Section 22.1.2** The Constructor shall indemnify the Representative from any losses resulting from delays in accepting the Works (or part of the Works) due to defects, debris or damage to the Works resulting from the Constructor's error or omission. These defects shall be rectified by the Constructor at the Constructor's expense.
22.2 **Personnel Qualifications**	**Insert at end of paragraph starting with "Personnel shall hold minimum qualifications…"** This shall also include the training requirements of any other SA Water Technical Standard which may be relevant to the works being undertaken.
23.5.3 **Disused / Redundant Sewers**	**Supersede Section 23.5.3 and replace with the following text:** All demolition and decommissioning shall be in accordance with TS 0620.
23.5.5 **Private and public properties**	**Insert (h) at the end of the existing list in 23.5.5:** Ensure the lids of structures on public property can be locked in place to prevent entry by non-authorised personnel.
23.7 **Alteration of Existing Services**	**Supersede Section 23.7 with the following:** **23.7.1 Location of Services** Details of services shown on the design drawings are not to be taken as indicating all existing services or exact locations. Constructors shall verify the exact location of all services which may be affected by construction activities, and positively locate in the field all services impacted by excavation works prior to commencing. Impacted service owners are to be notified, and works shall adhere to the requirements service owner. **23.7.2 Protection and Maintenance of Services** Protect and maintain existing services to the satisfaction of the service owner including, if necessary, relocation, temporary diversion, or support of the service. The clearance requirements of the proposed pipeline to existing services are as specified in TS 0136. **23.7.3 Repair of Services** If a service is damaged during excavation work, arrange or perform repairs to the satisfaction of the service owner.

WSA 06 Section	SA Water Supplementary Information
24.1 **Authorised Products and Materials**	**Supersede Section 24.1 with the following:** All products and materials shall be as per those approved within TS 0500, TS 0502 and TS 0506. The use of alternative products and materials will require a submission of a Technical Dispensation Request Form (TDRF) in accordance with SA Water's Technical Dispensation Request Procedure. Because the connection point(s) of the vacuum sewer may be into existing sewer system materials, products authorised in TS 0502 and if appropriate TS 0503 may be used to facilitate the connection. Any special connection details shall comply with the requirements of SA Water's Technical Standards and Drawings and are to be shown on the Design Drawings.
24.11 **Concrete Works**	**Supersede Section 24.11 with the following:** Refer to TS 0710 for SA Water's requirements regarding the supply and placement of concrete. Any repairs of existing concrete structures shall be undertaken in accordance with TS 0711. Repair of newly constructed concrete infrastructure is not acceptable, and defective construction shall be completely replaced.
32.1 **Safety**	**Insert at the start of Section 32.1:** The Constructor shall: • Provide a minimum of five (5) business days' notice in writing to the Representative of the Constructor's intention to commence work. • In accordance with Section 32.3, supply the Representative with written acknowledgment from the authority responsible for any improved services over which works are to be conducted (e.g., DIT or Local Government for roads etc.) of the Constructor's intention to carryout works before commencing work.
32.5 **Blasting**	**Supersede Section 32.5 with the following:** Blasting shall not be used in the construction of SA Water infrastructure.
32.6 **Support of Excavations**	**Insert the following before the first sentence:** The Constructor shall be responsible for assessing the geotechnical and groundwater information provided by the Designer on the Design Drawings (or other documents as appropriate), and implementing appropriate actions to facilitate sound construction. **Delete the last paragraph and replace with the following:** Shoring of excavations shall meet the requirements of TS 0712.
32.7 **Drainage and Dewatering**	**Insert the following at the end of Section 16.7:** The Constructor shall be responsible for: • The design, installation and operation of all groundwater and dewatering systems necessary to satisfy the requirements of SCM Drawings. • Obtaining any further geotechnical or groundwater information (including any specialist advice that may be necessary) for the design and operation of any groundwater or dewatering systems.

WSA 06 Section	SA Water Supplementary Information
32.8 **Foundations and Foundation Stabilisation**	**Insert the following text after first paragraph:** The Constructor shall be responsible for confirming, during excavation, whether the geotechnical conditions found on the site are in accordance with those indicated on the Design Drawings or documents, or in accordance with any subsequent investigations undertaken by the Constructor. Where the foundation conditions are found to be not as indicated on the Design Drawings or by any subsequent investigations undertaken by the Constructor, the Constructor shall not proceed with the Works, but shall refer the design back to the Designer for appropriate action via the Representative. Construction work shall only proceed after the appropriate foundation treatment has been specified and approved by the Designer and accepted in writing by the Representative.
33.2 **Bedding Materials**	**Replace the text in Section 33.2 with the following:** Mains are to be embedded in packing sand which meets the requirements of TS 0631.
34.1.3 **Polyethylene**	**Supersede Section 34.1.3 with the following:** All welding of polyethylene pipe shall comply with the requirements of TS 0503.
34.5 **Thrust and Anchor Blocks and Restrained Joints for Pressure Mains**	**Insert after the paragraph 4:** Where the PE Vacuum main is required to connect directly to a section of PVC-U sewer using either a flanged or threaded connection, a puddle flange and an anchor block are to be provided on the PE main approximately 1 m from the connection point to prevent expansion or contraction of the PE pipe damaging to the PVC pipework.
34.9.1 **Non-detectable Marking Tape**	**Delete Section 34.9.1**
34.9.2 **Detectable Marking Tapes**	**Replace the first paragraph of Section 34.9.2 with the following:** SA Water requires detectable marking tape 300 mm (approx.) above the top of all plastic vacuum pipes and associated pressure mains.
34.10 **Valves and Surface Fittings**	**Add the following text at the start of Section 34.10.1:** Only authorised valves, covers and frames as shown in TS 0506 are to be used in SA Water infrastructure.
34.17 **Location Markers**	**Insert at the end of Section 34.17:** Location markers are required where vacuum sewer pipes are laid in locations that may make it difficult to locate the pipes in the future. Location markers are required at changes of direction, valves, fittings and at maximum 200m centres.
34.19	**Supersede Section 34.19 with the following text:** All welding shall be undertaken in accordance with TS 0420, with protective

WSA 06 Section	SA Water Supplementary Information
Welding of Steel Pressure Mains	coatings to be reinstated, and cement mortar linings repairs in accordance with TS 0465.
35.1 **Collection Chambers and Maintenance Holes (MHs) - General**	**Insert after the first paragraph:** Step Irons and ladders are not required in SA Water's infrastructure.
37 **Pipe Embedment and Support**	**Supersede Section 37 with the following:** All pipe embedment/support and associated compaction testing shall be in accordance with TS 0622, TS 0631, and the SA Water SCM Drawings .
38.1 **Trench Fill**	**Supersede Section 38.1 with the following:** All pipe embedment/support and associated compaction testing shall be in accordance with TS 0622, TS 0631 and the SA Water SCM Drawings.
38.4 Compaction of Trench Fill **41.3.4Trench Fill Compaction Testing**	**Supersede Sections 38.4 and 41.3.4 with the following:** All compaction testing, frequency of testing, and any required re-testing shall be in accordance with TS 0622
41 **Acceptance Testing**	**Supersede Section 41.1 through 41.3, and 41.5 through 41.9 with the following:** Acceptance testing shall be conducted in accordance with TS 0210 and TS 0600. The requirements of TS 0524 shall also be adopted, for PVCU gravity sections of the network, excepting construction tolerances, which shall be as per Section 43.
44 **Work As-Constructed Details**	**Supersede Section 44 with the following:** As Constructed drawings shall be prepared in accordance with TS 0130, and Operation and Maintenance Manuals in accordance with TS 0132.

3.4 Part 4 – Standard Drawings

This Section outlines supplementary requirements to those presented within WSA 06-2008 V1.3 Part 4 – Standard Drawings.

All drawings not listed in this section are deemed to be acceptable in terms of design principles, subject to further design detail development.

WSA 06 Section/Drawing	SA Water Supplementary Information
45 **Introduction**	**Insert at the end of Section 45.2:** SEW and WAT drawings for information only – to be used only where applicable.
VAC-1101	Allowable pipe materials for vacuum pipelines to be as per TS 0506.
VAC-1102	Only DNs that comply with TS 0502 to be used. All other DNs require an approved TDRF.
VAC-1200	Step irons/fixed ladder not required.
VAC-1201	Step irons/fixed ladder not required.
VAC-1202	Step irons/fixed ladder not required.
VAC-1203	Step irons/fixed ladder not required.
VAC-1204	Collection chambers requiring landings for safe access not acceptable to SA Water.